

0205/10  
470**CONFIDENTIAL**

May 4, 1967

25X1

[redacted]  
Post Office Box 6700  
Fort Davis Station  
Washington, D. C. 20020

Declass Review by NGA.

25X1

Attention: [redacted]

25X1

Subject: [redacted]

Gentlemen:

In accordance with the subject contract, enclosed are two copies of the Interim Technical Report covering the period from January 27, 1967 to March 24, 1967.

To re-emphasize the final paragraph of the report, we must have from your technical representative the eyepiece diameter and shoulder to end of tube dimension with tolerances of the [redacted] Eyepieces.

25X1

As noted below, three copies of this report are being forwarded directly to the technical representative.

Very truly yours,

25X1

[redacted]  
Encs.Contract Administrator  
Photogrammetric Contracts Section

cc: Ed D (3 Encs.)

Group 1  
Excluded from automatic  
downgrading and  
declassification

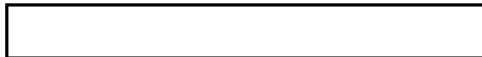
**CONFIDENTIAL**

INTERIM REPORT

FOR

Anamorphic System for High Power Stereoviewer

Prepared by



April 1967

25X1

Interim Report  
For  
Anamorphic System for High Power Stereoviewer

ABSTRACT

The design phase of the Anamorphic System for the High Power Stereoviewer is proceeding according to schedule. The design of the optical system was completed and released for mechanical design. The mechanical design study has shown that a three bar linkage drive for the anamorphic prisms offers several advantages over the cam drive system used on the advanced Anamorphic Eyepiece.

Table of Contents

- 1.0 Introduction
- 2.0 Optical Design
- 3.0 Mechanical Design
- 4.0 Summary
- 5.0 Contract Status

## 1.0 Introduction

This first Interim Report on the Anamorphic System for the High Power Stereoviewer covers the period 27 January 1967 to 24 March 1967. Work performed during this period was divided into two major tasks; the optical design and the mechanical design. Sections 2.0 and 3.0 describe the optical and mechanical design efforts respectively. Section 4.0 is a summary of the work performed during this reporting period. Section 5.0 summarizes the Contract Status with respect to future plans, technical problems, costs, schedule, etc.

This contract is divided into two phases. The first phase covers the Design Analysis Study of the Anamorphic System and extends from 27 January 1967 to 26 May 1967. This first Interim Report describes the design effort expended through approximately half of Phase I. A Final Report will be submitted at the conclusion of Phase I which describes the complete Design Study.

Phase II consists of the detail design, fabrication and testing of the Anamorphic Systems. It will begin after receipt of customer approval of the design and will be completed five months after this customer approval.

## 2.0 Optical Design

The proposal for variable anamorphic eyepieces for the High Power Stereoviewer described how variable anamorphism could be achieved with either a zooming cylinder lens system or a tilting prism system.

The former type had been used on the first variable anamorphic eyepiece designed for the Zoom 70. The latter type was being used under the then current contract for design of an improved anamorphic eyepiece for the Zoom 70. Choice of the type of system was to be made after assembly and evaluation of the latter units.

Experience with the tilting prism system showed that it was far superior in every respect to the zoom cylinder lens system. Consequently the prism type system was selected for the High Power Stereoviewer anamorphic attachment. In fact it was found possible to use exactly the same prism system so that no new design was required for the prisms providing the variable anamorphic system. Thus it was only necessary to design a collimating and de-collimating lens to match the prism system to the High Power Stereoviewer.

Straightforward design procedures rapidly yielded appropriate lenses to meet this requirement. Use of a negative collimating lens positioned just above the relay lens at the bottom of the eyepiece tube permitted design of a system giving an eye extension of approximately 22mm. This close packed design resulted in some mechanical problems to be described later. A solution to these problems was found that did not require modification of the optical design.

Analysis indicates that there will be no degradation of performance of the High Power Stereoviewer. This analysis has been confirmed by testing the Zoom 70 anamorphic eyepieces on the High Power Stereoviewer. No loss in performance could be detected when this test was performed using  objectives with  eyepieces.

25X1

eyepieces so a complete test could not be made. However, we are confident from these tests and our analysis that this optical system will not degrade the performance of the High Power Stereoviewer.



### 3.0 Mechanical Design

The initial mechanical design approach was the use of the prism drive system of the Zoom 70 advanced Anamorphic Eyepiece. In this system each of the four prisms is supported in a yoke which is free to pivot. The end of each yoke rides in a cam slot cut into a tube. Rotation of the tube causes rotation of each yoke about its pivot thus introducing prism tilt and its attendant anamorphic magnification.

The use of the cam driven prism system has several disadvantages when applied without modification to the High Power Stereoviewer. In order to provide adequate wall thickness for the cam slot of the prism assembly, the entire prism system had to be moved toward the eyepiece by approximately .040". This displacement of the optical system would cause some field vignetting at the 1x anamorphic magnification. A second difficulty would be the need to remove the three screws which fasten the 1x relay to the High Power Stereoviewer. This, though not a major modification, is certainly an objectionable feature. At this point the cam drive approach was set aside and different methods used to provide prism motion were considered.

Near the end of this reporting period a three bar linkage was studied as a means of providing prism tilt. At this initial stage of the design it appears to be a very promising system and as such will be studied in detail. At present two of its most appealing advantages are compact size and relative ease of manufacture.

#### 4.0 Summary

The optical design of the Anamorphic Attachment was completed. Use of the cam drive system from the advanced Anamorphic Eyepiece proved unsuccessful for our application. A unique application of the three bar linkage to provide prism motion has shown great promise and will be studied further

## 5.0 Contract Status

The following table summarizes the percentage of work completed according to task:

Optical Design	100%
Mechanical Design	15%

Planned activities for the next reporting period are: 1) Calculation of the mechanical linkage for the prism system, 2) Final design of the Anamorphic Attachment, 3) Submittal of the Final Report and the Design Analysis Study.

The Anamorphic Eyepiece Attachment will be used primarily with [ ] eyepieces.

25X1

25X1

[ ] has one [ ] 6x and one [ ] 10x eyepiece which will be used for

25X1

25X1

the nominal eyepiece dimensions required for the design layout. In order to insure compatability with all [ ] Eyepieces, however, it is necessary to have the eyepiece diameter and shoulder to end of tube dimensions with tolerances.